

Claims

What is claimed is:

1. A method of presenting data, said method comprising:

selecting a display mode for displaying thread data of one or more threads of at least one application, said display mode comprising one of a function-centric display mode and a thread-centric display mode; and

displaying said thread data based on the selected display mode.

2. The method of claim 1, wherein said selecting further comprises dynamically switching, by a user, between said function-centric display mode and said thread-centric display mode.

3. The method of claim 1, wherein the selected display mode is the function-centric display mode, and wherein said displaying comprises displaying a hierarchical structure which includes one or more functions having a parental relationship to the one or more threads, the hierarchical structure including corresponding thread data for each of the one or more threads of the one or more functions.

4. The method of claim 3, wherein the corresponding thread data for a thread includes performance data of that thread as it pertains to a particular function.

5. The method of claim 1, wherein the selected display mode is the thread-centric display mode, and wherein said displaying comprises displaying a hierarchical structure in which the one or more threads have a parental relationship to one or more other components of said at least one application, the hierarchical structure including corresponding thread data for each of the one or more threads.

6. The method of claim 5, wherein the corresponding thread data for a thread includes accumulated performance data of the one or more other components that are children of that thread.

7. The method of claim 1, wherein said data includes performance data of said one or more threads.

8. The method of claim 7, wherein said performance data comprises profile data of said one or more threads.

9. The method of claim 1, wherein said selected display mode is the function-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing a particular function of the at least one application.

10. The method of claim 1, wherein said selected display mode is the thread-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing one or more functions of the at least one application.

10. The method of claim 1, wherein said selected display mode is the thread-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing one or more functions of the at least one application.

11. A method of presenting data, said method comprising:

selecting a display mode from a plurality of display modes for displaying performance data of one or more threads of an application, said plurality of display modes comprising a thread-centric display mode focused on an individual thread's activity; and

displaying said performance data of said one or more threads based on the selected display mode.

12. The method of claim 11, wherein said thread-centric display mode includes an indication of at least one of: the threads created at runtime, one or more functions executed by a thread, and an amount of system resources consumed by a thread in each function executed by the thread.

13. The method of claim 11, wherein said plurality of display modes further comprises a function-centric mode focusing on activities associated with a particular function.

14. A method of presenting data, said method comprising:

creating a plurality of data structures to be used in displaying performance data of at least one application, wherein at least one data structure of the plurality of data structures has associated therewith performance data of at least one thread of the at least one application; and

presenting the one or more data structures in an organizational structure, wherein the organizational structure is based on at least one of functional activities within the at least one application and thread activities within the at least one application.

15. The method of claim 14, wherein said performance data of said at least one thread comprises profile data of said at least one thread.

16. The method of claim 14, wherein said plurality of data structures comprises at least one of a process object, a file object, a function object and a thread object.

17. The method of claim 14, wherein the creating is based upon whether the organizational structure is based on functional activities or thread activities.

18. The method of claim 14, wherein the organizational structure is based on functional activities, and wherein said presenting comprises using a hierarchical structure of: process data structure→file data structure→function data structure→thread data structure.

19. The method of claim 14, wherein the organizational structure is based on thread activities, and wherein the presenting comprises using a hierarchical structure of: process data structure→thread data structure→file data structure→function data structure.

20. The method of claim 14, further comprising accumulating performance data for one or more data structures of the plurality of data structures, and wherein said presenting comprises displaying the accumulated performance data with its corresponding data structure.

21. The method of claim 14, wherein the organizational structure is based on functional activities, and wherein the presenting includes displaying one or more functions of said at least one application, and for each function of said one or more functions, displaying one or more threads executing that function, along with the performance data of that thread as it pertains to that function.

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23. A memory for storing data to be displayed, said memory comprising:

a data construct usable in data visualization, said data construct comprising:

one or more process objects representing one or more executable entities; and

one or more thread objects associated with at least one process object of said one or more process objects, said one or more thread objects including performance data representing runtime thread activity.

24. The data construct of claim 23, further comprising one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children of at least one process object of the one or more process objects and parents to at least one thread object of the one or more thread objects.

25. The data construct of claim 23, further comprising one or more function objects representing one or more functions, and wherein in a hierarchical structure, said one or more function objects are children to at least one thread object of the one or more of the thread objects, and the one or more thread objects are children to at least one process object of the one or more process objects.

26. A system of presenting data, said system comprising:

means for selecting a display mode for displaying thread data of one or more threads of at least one application, said display mode comprising one of a function-centric display mode and a thread-centric display mode; and

means for displaying said thread data based on the selected display mode.

27. The system of claim 26, wherein said means for selecting further comprises means for dynamically switching, by a user, between said function-centric display mode and said thread-centric display mode.

28. The system of claim 26, wherein the selected display mode is the function-centric display mode, and wherein said means for displaying comprises means for displaying a hierarchical structure which includes one or more functions having a parental relationship to the one or more threads, the hierarchical structure including corresponding thread data for each of the one or more threads of the one or more functions.

29. The system of claim 28, wherein the corresponding thread data for a thread includes performance data of that thread as it pertains to a particular function.

30. The system of claim 26, wherein the selected display mode is the thread-centric display mode, and wherein said means for displaying comprises means for displaying a hierarchical structure in which the one or more threads have a parental relationship to one or more other components of said at least one application, the hierarchical structure including corresponding thread data for each of the one or more threads.

31. The system of claim 30, wherein the corresponding thread data for a thread includes accumulated performance data of the one or more other components that are children of that thread.

32. The system of claim 26, wherein said data includes performance data of said one or more threads.

33. The system of claim 32, wherein said performance data comprises profile data of said one or more threads.

34. The system of claim 26, wherein said selected display mode is the function-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing a particular function of the at least one application.

1927-28	1928-29	1929-30	1930-31	1931-32	1932-33	1933-34	1934-35	1935-36	1936-37	1937-38	1938-39	1939-40	1940-41	1941-42	1942-43	1943-44	1944-45	1945-46	1946-47	1947-48	1948-49	1949-50	1950-51	1951-52	1952-53	1953-54	1954-55	1955-56	1956-57	1957-58	1958-59	1959-60	1960-61	1961-62	1962-63	1963-64	1964-65	1965-66	1966-67	1967-68	1968-69	1969-70	1970-71	1971-72	1972-73	1973-74	1974-75	1975-76	1976-77	1977-78	1978-79	1979-80	1980-81	1981-82	1982-83	1983-84	1984-85	1985-86	1986-87	1987-88	1988-89	1989-90	1990-91	1991-92	1992-93	1993-94	1994-95	1995-96	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35	2035-36	2036-37	2037-38	2038-39	2039-40	2040-41	2041-42	2042-43	2043-44	2044-45	2045-46	2046-47	2047-48	2048-49	2049-50	2050-51	2051-52	2052-53	2053-54	2054-55	2055-56	2056-57	2057-58	2058-59	2059-60	2060-61	2061-62	2062-63	2063-64	2064-65	2065-66	2066-67	2067-68	2068-69	2069-70	2070-71	2071-72	2072-73	2073-74	2074-75	2075-76	2076-77	2077-78	2078-79	2079-80	2080-81	2081-82	2082-83	2083-84	2084-85	2085-86	2086-87	2087-88	2088-89	2089-90	2090-91	2091-92	2092-93	2093-94	2094-95	2095-96	2096-97	2097-98	2098-99	2099-00	2100-01	2101-02	2102-03	2103-04	2104-05	2105-06	2106-07	2107-08	2108-09	2109-10	2110-11	2111-12	2112-13	2113-14	2114-15	2115-16	2116-17	2117-18	2118-19	2119-20	2120-21	2121-22	2122-23	2123-24	2124-25	2125-26	2126-27	2127-28	2128-29	2129-30	2130-31	2131-32	2132-33	2133-34	2134-35	2135-36	2136-37	2137-38	2138-39	2139-40	2140-41	2141-42	2142-43	2143-44	2144-45	2145-46	2146-47	2147-48	2148-49	2149-50	2150-51	2151-52	2152-53	2153-54	2154-55	2155-56	2156-57	2157-58	2158-59	2159-60	2160-61	2161-62	2162-63	2163-64	2164-65	2165-66	2166-67	2167-68	2168-69	2169-70	2170-71	2171-72	2172-73	2173-74	2174-75	2175-76	2176-77	2177-78	2178-79	2179-80	2180-81	2181-82	2182-83	2183-84	2184-85	2185-86	2186-87	2187-88	2188-89	2189-90	2190-91	2191-92	2192-93	2193-94	2194-95	2195-96	2196-97	2197-98	2198-99	2199-00	2200-01	2201-02	2202-03	2203-04	2204-05	2205-06	2206-07	2207-08	2208-09	2209-10	2210-11	2211-12	2212-13	2213-14	2214-15	2215-16	2216-17	2217-18	2218-19	2219-20	2220-21	2221-22	2222-23	2223-24	2224-25	2225-26	2226-27	2227-28	2228-29	2229-30	2230-31	2231-32	2232-33	2233-34	2234-35	2235-36	2236-37	2237-38	2238-39	2239-40	2240-41	2241-42	2242-43	2243-44	2244-45	2245-46	2246-47	2247-48	2248-49	2249-50	2250-51	2251-52	2252-53	2253-54	2254-55	2255-56	2256-57	2257-58	2258-59	2259-60	2260-61	2261-62	2262-63	2263-64	2264-65	2265-66	2266-67	2267-
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36. A system of presenting data, said system comprising:

means for selecting a display mode from a plurality of display modes for displaying performance data of one or more threads of an application, said plurality of display modes comprising a thread-centric display mode focused on an individual thread's activity; and

means for displaying said performance data of said one or more threads based on the selected display mode.

37. The system of claim 36, wherein said thread-centric display mode includes an indication of at least one of: the threads created at runtime, one or more functions executed by a thread, and an amount of system resources consumed by a thread in each function executed by the thread.

38. The system of claim 36, wherein said plurality of display modes further comprises a function-centric mode focusing on activities associated with a particular function.

39. A system of presenting data, said system comprising:

means for creating a plurality of data structures to be used in displaying performance data of at least one application, wherein at least one data structure of the plurality of data structures has associated therewith performance data of at least one thread of the at least one application; and

means for presenting the one or more data structures in an organizational structure, wherein the organizational structure is based on at least one of functional activities within the at least one application and thread activities within the at least one application.

40. The system of claim 39, wherein said performance data of said at least one thread comprises profile data of said at least one thread.

41. The system of claim 39, wherein said plurality of data structures comprises at least one of a process object, a file object, a function object and a thread object.

42. The system of claim 39, wherein the means for creating creates said plurality of data structures based upon whether the organizational structure is based on functional activities or thread activities.

43. The system of claim 39, wherein the organizational structure is based on functional activities, and wherein said means for presenting comprises means for using a hierarchical structure of: process data structure→file data structure→function data structure→thread data structure.

44. The system of claim 39, wherein the organizational structure is based on thread activities, and wherein the means for presenting comprises means for using a hierarchical structure of: process data structure→thread data structure→file data structure→function data structure.

45. The system of claim 39, further comprising means for accumulating performance data for one or more data structures of the plurality of data structures, and wherein said means for presenting comprises means for displaying the accumulated performance data with its corresponding data structure.

46. The system of claim 39, wherein the organizational structure is based on functional activities, and wherein the means for presenting includes means for displaying one or more functions of said at least one application, and for each function of said one or more functions, displaying one or more threads executing that function, along with the performance data of that thread as it pertains to that function.

47. The system of claim 39, wherein the organization structure is based on thread activities, and wherein the means for presenting comprises means for displaying one or more threads of said at least one application, and for each thread of said one or more threads, displaying its associated performance data, which reflects performance data of the one or more functions executed by that thread.

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48. A system of presenting data, said system comprising:

a computing unit to select a display mode for displaying thread data of one or more threads of at least one application, said display mode comprising one of a function-centric display mode and a thread-centric display mode; and

a display of said thread data based on the selected display mode.

49. A system of presenting data, said system comprising:

a display mode selected from a plurality of display modes for displaying performance data of one or more threads of an application, said plurality of display modes comprising a thread-centric display mode focused on an individual thread's activity; and

a display of said performance data of said one or more threads based on the selected display mode.

50. A system of presenting data, said system comprising:

a plurality of data structures to be used in displaying performance data of at least one application, wherein at least one data structure of the plurality of data structures has associated therewith performance data of at least one thread of the at least one application; and

a computing unit to present the one or more data structures in an organizational structure, wherein the organizational structure is based on at least one of functional activities within the at least one application and thread activities within the at least one application.

51. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method of presenting data, said method comprising:

selecting a display mode for displaying thread data of one or more threads of at least one application, said display mode comprising one of a function-centric display mode and a thread-centric display mode; and

displaying said thread data based on the selected display mode.

52. The at least one program storage device of claim 51, wherein said selecting further comprises dynamically switching, by a user, between said function-centric display mode and said thread-centric display mode.

53. The at least one program storage device of claim 51, wherein the selected display mode is the function-centric display mode, and wherein said displaying comprises displaying a hierarchical structure which includes one or more functions having a parental relationship to the one or more threads, the hierarchical structure including corresponding thread data for each of the one or more threads of the one or more functions.

54. The at least one program storage device of claim 53, wherein the corresponding thread data for a thread includes performance data of that thread as it pertains to a particular function.

55. The at least one program storage device of claim 51, wherein the selected display mode is the thread-centric display mode, and wherein said displaying comprises displaying a hierarchical structure in which the one or more threads have a parental relationship to one or more other components of said at least one application, the hierarchical structure including corresponding thread data for each of the one or more threads.

56. The at least one program storage device of claim 55, wherein the corresponding thread data for a thread includes accumulated performance data of the one or more other components that are children of that thread.

57. The at least one program storage device of claim 51, wherein said data includes performance data of said one or more threads.

58. The at least one program storage device of claim 57, wherein said performance data comprises profile data of said one or more threads.

59. The at least one program storage device of claim 51, wherein said selected display mode is the function-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing a particular function of the at least one application.

60. The at least one program storage device of claim 51, wherein said selected display mode is the thread-centric mode, and the thread data of a thread of said one or more threads comprises data indicating an amount of system resources consumed by the thread when executing one or more functions of the at least one application.

61. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method of presenting data, said method comprising:

selecting a display mode from a plurality of display modes for displaying performance data of one or more threads of an application, said plurality of display modes comprising a thread-centric display mode focused on an individual thread's activity; and

displaying said performance data of said one or more threads based on the selected display mode.

62. The at least one program storage device of claim 61, wherein said thread-centric display mode includes an indication of at least one of: the threads created at runtime, one or more functions executed by a thread, and an amount of system resources consumed by a thread in each function executed by the thread.

63. The at least one program storage device of claim 61, wherein said plurality of display modes further comprises a function-centric mode focusing on activities associated with a particular function.

64. At least one program storage device readable by a machine, tangibly embodying at least one program of instructions executable by the machine to perform a method of presenting data, said method comprising:

creating a plurality of data structures to be used in displaying performance data of at least one application, wherein at least one data structure of the plurality of data structures has associated therewith performance data of at least one thread of the at least one application; and

presenting the one or more data structures in an organizational structure, wherein the organizational structure is based on at least one of functional activities within the at least one application and thread activities within the at least one application.

65. The at least one program storage device of claim 64, wherein said performance data of said at least one thread comprises profile data of said at least one thread.

66. The at least one program storage device of claim 64, wherein said plurality of data structures comprises at least one of a process object, a file object, a function object and a thread object.

67. The at least one program storage device of claim 64, wherein the creating is based upon whether the organizational structure is based on functional activities or thread activities.

68. The at least one program storage device of claim 64, wherein the organizational structure is based on functional activities, and wherein said presenting comprises using a hierarchical structure of: process data structure→file data structure→function data structure→thread data structure.

69. The at least one program storage device of claim 64, wherein the organizational structure is based on thread activities, and wherein the presenting comprises using a hierarchical structure of: process data structure→thread data structure→file data structure→function data structure.

70. The at least one program storage device of claim 64, wherein said method further comprises accumulating performance data for one or more data structures of the plurality of data structures, and wherein said presenting comprises displaying the accumulated performance data with its corresponding data structure.

71. The at least one program storage device of claim 64, wherein the organizational structure is based on functional activities, and wherein the presenting includes displaying one or more functions of said at least one application, and for each function of said one or more functions, displaying one or more threads executing that function, along with the performance data of that thread as it pertains to that function.

72. The at least one program storage device of claim 64, wherein the organization structure is based on thread activities, and wherein the presenting comprises displaying one or more threads of said at least one application, and for each thread of said one or more threads, displaying its associated performance data, which reflects performance data of the one or more functions executed by that thread.

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